

NOTES ON JAMAICAN FLOWERING PLANTS I**New species and varieties in *Pilea***

by

C. D. ADAMS**(University of the West Indies, Mona, Jamaica)**1. Distribution and number of species

Pilea (Urticaceae - Procridaeae) is one of the larger and therefore at least floristically more important of the genera of tropical flowering plants. It is also a genus which seems to be biologically and taxonomically poorly understood. Being mainly herbaceous, *Pilea* shares with *Peperomia* and *Begonia* a number of life-form characteristics as well as similar ecological niches. Most of these plants are chamaephytes with low leafy often trailing and rooting growth and tend to be more abundant in shaded or sheltered damp cool places. The smaller species resemble and are found growing with epipetric ferns and mosses. Although some of the species have small succulent leaves they do not occur in areas where prolonged periods of drought occur.

Perhaps because many of the species seem to differ only very slightly from each other, classification of *Pilea* has been regarded as difficult and there are no modern treatments which can be referred to for critical taxonomic, evolutionary or phyto-geographical data and commentary. Apart from one species *Pilea microphylla*¹⁾, which is ubiquitous in warm damp places, it

¹⁾ It is a fact that several other large widespread tropical genera also have one very common weedy species, e.g. *Cyperus rotundus*, *Peperomia pellucida* and *Vernonia cinerea*.

is evident that most of the species have small areas of natural distribution. There is also however a prevalent notion that when the whole genus is properly revised, at least half the published names will disappear into synonymy and the high figures for endemism will automatically fall. Such an idea probably accounts for the fact that, although Index Kewensis, up to and including Suppl. XIII (1966), lists over 600 validly published binomials in *Pilea*, authors cite the following numbers of species for the genus: FAWCETT & RENDLE (1914) "over 100" (although by this time well over 200 had been listed); LEMÉE (1934) "about 300"; LAWRENCE (1951) "over 200"; LEÓN & ALAIN (1951) "over 300"; MELCHIOR in ENGLER (1964) "200".

Recent examination of patterns of variation among the Jamaican and other West Indian representatives of this genus, indicates that the concept of a large number of endemic species is a realistic one. Current study for Jamaica alone has shown that for the same taxa dealt with by FAWCETT & RENDLE (1914), revision has resulted in a numerical change from 42 species with 34 endemic then to 41 species with 30 endemic at the present time, involving about 50 published names but excluding the 7 new species described in this paper; the reduction in the number of endemics is partly due to taxonomic reappraisal and partly the result of explorations elsewhere. These are very small changes for over fifty years of further collecting and study.

The numbers of species currently recognized for the Greater Antilles are:

| | Total | Endemic |
|---|-------|---------|
| Cuba (LEÓN & ALAIN, 1951) | 65 | 52 |
| Hispaniola (MOSCOSO, 1943) | 100 | 84 |
| Puerto Rico (BRITTON & WILSON, 1924) | 16 | 6 |
| Jamaica | 48 | 37 |

From these figures it is seen that the total of single-island endemic species alone is 179.

The world distribution of the published names in Index Kewensis is as follows:

| | Names of Species | % |
|---------------------------------|------------------|------|
| America, subtropics and tropics | 406 | 68.0 |
| Africa | 27 | 4.5 |

| | | |
|--|-----------|------|
| Indian Ocean (Ceylon to Madagascar) | 34 | 5.0 |
| Asia (continent proper, India to China) | 57 | 9.5 |
| Asia (Malay peninsula and islands, Pacific) | 79 | 13.0 |
| | <hr/> 603 | |

It is predicted that taxonomic revision would result in the conclusion that the West Indies has about 200 species, continental America about another 150 and the Old World and Pacific at least a further 150 "good" species, the latter figure likely to be increased after further exploration in New Guinea and other less well known areas of Australasia and the Pacific. It would seem therefore that a more accurate estimate of the total number of species in the genus is "about 500" or "over 500 species".

2. Future taxonomic investigations

The general literature, such as for example in L. H. BAILEY (1947), is full of statements indicating particular difficulty in understanding these plants. BAILEY in adjacent paragraphs has all of the following: "... , but whether there is more than one species in common cultivation it is not easy to determine, for specific characters are difficult to draw". "The species are confused." "The plants are variable and characters apparently not well understood." "... , but it is difficult to determine them." In taxonomy lack of knowledge is the usual reason for confusion and uncertainty and this is often the consequence of lack of attention. This is strange for *Pilea* because there are many features of great interest which should have stimulated detailed study. The plants preserve well and retain most of their characters in herbarium material. WEDDELL (1869) and in previous monographs drew attention to most of the important taxonomic criteria in his comprehensive treatment which recognized at that time 159 species. The intervening 100 years has not seen the publication of any further major contributions.

There are features of morphology improved knowledge of which could materially assist taxonomic judgements. Besides the distribution of the unisexual flowers which may be dioecious or at various levels of proximity or anthesis-time in monoecious conditions, the sizes, shapes, sculpturing and distribution of cystoliths and the incidence and distribution of unicellular and pluricellular hairs, may prove to be more useful characters when studied in greater detail.

Facts of floral biology are undoubtedly correlated with features of the environment and must have a bearing on evolution and taxonomy. The following points are mentioned specifically as they suggest additional field or garden studies:

- (a) The flowers have abiotic pollination there being neither optical nor olfactory attraction and visits of insects have not been observed.
- (b) The pollen is dry and air-borne being launched by the well known catapult action of the filaments at anthesis.
- (c) It is not so well known that, at least in some species of *Pilea*, the achenial fruit is similarly propelled a short upward distance by an identical action of the 2 or 3 inflexed staminodes in the female flower. These staminodes are rapidly accrescent during fruit maturation and when fully extended may equal or exceed the perianth (MOSEBACH, 1932).
- (d) The achenes have no special adhesive organs although they will stick to passing objects when wet. RIDLEY (1930) noted the presence of achenes of *Pilea microphylla* in imported wool. The fruit-wall is usually finely muriculate or papillose and this may impart some weak adhesive property.

3. Discussion

The large number of taxa could have been the result of free gene exchange through hybridization. The dry air-borne pollen would facilitate this. The preferred cool sheltered habitats often occurring in highly dissected topography such as is found in the wet limestone areas of Jamaica, combined with limited potential for fruit dispersal, would conversely encourage isolation and the existence of many variants in relatively small spatially restricted populations.

These hypotheses could be tested by hybridization experiments (particularly easy to carry out with unisexual flowers) and analysis of character distribution on regional bases. The criteria for taxonomic appraisal are mostly of a sort which can be expressed in two states and, although rather few, might lend themselves to numerical methods. As the highest concentration of species seems to be in the West Indies as intensive study of *Pilea* here should afford a substantial and much needed advance.

4. Description of new taxa for Jamaica

Pilea andersonii Adams, spec. nov.

Suffrutex 1 - 2 m altus; caulis plus minusve tetragonus, 5 - 7 mm crassus, dense pilosus saltem juventute. Folia aequalia in quoque pari; lamina late ovata subtriplinervis basi late rotundata vel cordulata apice caudato-acuminata margine grosse serratodentata, supra ubique et infra in nervis et venis dense pubescentia pilis unicellularibus; petioli 1 - 6.5 cm longi, pilosi; stipulae late rotundatae usque 1.5 cm longae subpersistentes glabrae praeter marginem ciliatum. Inflorescentia paniculata ramis ascendentibus minimum quater ramosis; pedunculi graciles pilosi usque 4 cm longi; flores feminei tantum cogniti (? plantae dioeciae); perianthium multum rubro suffusum. Achenium ovoideum vel obovoideum leviter compressum apiculatum 0.3 - 0.5 mm longum.

Exsiccatae: Jamaica, St. Thomas parish, west slopes of Blue Mountain Peak, (5500-) 6500 (-7400) ft., along trail and in partly open areas in montane woodland; sterile, 8. XI. 1954, G. R. PROCTOR 9444 (IJ); fl. & fr. 20. VII. 1956, D. POWELL 315 (IJ); fl. & fr. 24. VII. 1963, W. R. ANDERSON, M. R. CROSBY & H. A. HESPENHEIDE 911 (DUKE, UCWI holotype).

Note: This new species closely resembles the common P. grandifolia (L.) Blume which has glabrous or nearly glabrous stems and petioles. It is named to commemorate the first visit of Wm. R. ANDERSON and his colleagues from Duke University to Jamaica in the summer of 1963.

Pilea impressa Urb. var. barbata Adams var. nov.

A planta Urbanii pilis magnis longis albis unicellularibus in perianthio florum masculorum differt; perianthium florum femineorum pilis paucis.

Exsiccatae: Jamaica, Clarendon parish; Aenon Town to McKoy, Peckham Woods, 2300 ft., trailing on rocks in shade, fl. & fr. 19. VIII. 1963, C. D. ADAMS 12605 (BM, M, UCWI holotype); ibid. W. R. ANDERSON & M. R. CROSBY 1257 (DUKE).

Pilea laurea Adams, spec. nov.

Herba fruticulosa perennis, dioecia, fere omnino glabra; caules laxe caespitosi usque 40 cm alti, paulo ramosi internodiis

supernis valde brevioribus. Folia prasina in extremitatibus ramulorum plus minusve conferta; lamina subintegra trinervia, 1,3 - 4,3 x 1 - 2,6 cm, late ovata, apice abrupte cuspidato-acuminata, margine parum irregulari, basi plerumque late rotundata, supra pilis magnis rarissimis praesertim juventute cystolithis brevissimis linearibus; petioli rosei usque 3,2 cm longi; stipulae cr. 0,5 mm longae. Inflorescentiae sessiles floribus in fasciculis cr. 5 mm diam; flores masculi distincte pedicellati albi, perianthio 4-lobato cr. 1,3 mm longo, bracteis fimbriatis ferrugineis; flores feminei in fasciculis arctioribus sub anthesi sine bracteis.

Exsiccatae: Jamaica, Trelawny parish, Miss Laura's Hill, Wilson Valley District, cr. 1 mile north of Warsop, 2000-2200 ft., on shaded limestone ledge, fl. 11.1.1964 (and 31.III.1964, same plant), G.R.PROCTOR 24470 (IJ holotype); ibid. 17.V.1964, G.R. PROCTOR 24844 (IJ, UCWI).

Note: This new species resembles *P. virgata* Wedd. which differs in having longer narrower more shortly petiolate leaves spread uniformly along the stem. *P. virgata* is restricted to the parishes of St. Catherine and St. Ann in Jamaica.

Pilea ordinata Adams, spec.nov. (Pl. A)

Herba rhizomatosa perennis, ramis foliatis plus minusve caespitosis ascendentibus, 4 - 10 cm longis interdum denuo ramicantibus et radicanibus; caules tenues rigentes glabri internodiis 2 - 4 mm longis. Folia numerosa ordinate et aequae disposita, valde disparia in quoque pari; lamina obovata vel oblanceolata integra, majora 5 - 10 x 2 - 4 mm, uninervia interdum subtriplinervia, minora usque 2 mm longa, glabra praeter marginem distalem setuloso-ciliatum, supra cystolithis magnis ab nervo medio ascendentibus, subtus rosea cystolithis multo minoribus, cum submarginibus ambabus cystolithis maximis contiguis lineatis; petioli usque 1 mm longi; stipulae latae 0,4 - 0,5 mm longae persistentes. Inflorescentiae cymoso-subcapitatae unisexuales vel androgynae; pedunculi exiles cr. 10 mm longi; perianthium floris masculi appendicibus deltatis adjectis 1,5 mm longum. Achenium anguste ellipticum glanduloso-papillosum 0,7 mm longum.

Exsiccatae: Jamaica, Hanover parish; Shepherds Hall, 1 mile east of Great Valley post office, 1100 ft., on moist shaded limestone cliffs, male fl. 28.X.1952, G.R.PROCTOR 7249 (IJ); below Cabarita River bridge, 0,3 mile north of Flower Hill postal agency,

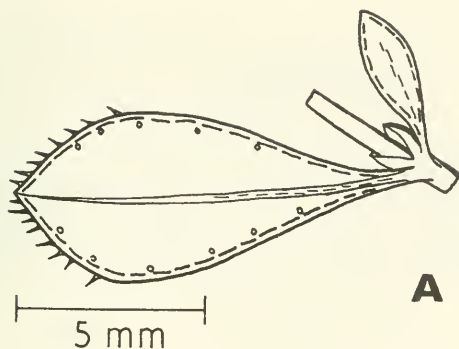


Plate A. : Abaxial view of a pair of leaves of *P. ordinata*, the smaller cystoliths omitted, from PROCTOR 26588.

600-700 ft., on moist shaded limestone boulders, fl. & fr.
8. VIII. 1965, G. R. PROCTOR 26588 (IJ holotype, M, UCWI); north slopes of Bubby Hill, cr. 1 mile south-west of Hillsbrook, 1000-1400 ft., on shaded limestone ledges, fl. 29. VIII. 1965, G. R. PROCTOR 26670 (IJ).

Note: No other species has been found which this new species resembles closely.

Pilea portlandiana Adams, spec. nov. (Pl. B)

Herba perennis; rami plus minusve caespitosi sed effusi et radicanes; caules filiformes 3 - 12 cm longi internodiis glabris 2 - 5 (- 7) mm longis. Folia disparia; lamina rotundata vel late ovata, majora in dimidio distali 3 - 5-lobata usque 7 x 6 mm, pro parte maxima uninervia, minora integra cr. 2 mm diam, supra cystolithis paucis magnis (cr. 0.5 mm longis) et pilis magnis unicellularibus superficialibus et marginalibus (ciliatis), subtus glabra rosea cystolithis parvulis pilis paucis in nervo medio; petioli tenues glabri 1 - 9 mm longi; stipulae semilunatae persistentes glabrae 0.7 - 1 mm longae, 1.4 - 1.7 mm latae. Inflorescentiae capitatae unisexuales vel androgynae; pedunculi exiles 8 - 18 mm longi; perianthium floris masculi glabrum 1.4 mm longum. Achenium late ellipticum marginatum 0.7 mm longum.

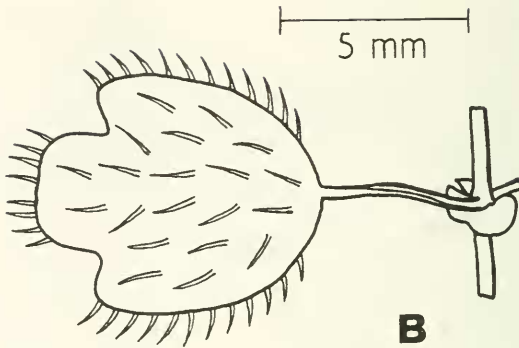


Plate B. : Adaxial view of a single leaf of *P. portlandiana* with cystoliths omitted, from ADAMS 9133.

Exsiccatae: Jamaica, Portland parish; 1-2.5 miles south-west of Ecclesdown, 1200-2500 ft.; moist shaded limestone ledges, fr. 6. VIII. 1954, G. R. PROCTOR 9226 (IJ); *ibid.*, vertical limestone cliff in shade, 11. VIII. 1955, G. R. PROCTOR 10484 (IJ); *ibid.*, moist shaded limestone ledges, fl. 9. III. 1957, G. R. PROCTOR 16273 (IJ); *ibid.*, on limestone rocks in shade, 1. III. 1961, C. D. ADAMS 9133 (M, UCWI); *ibid.*, moist shaded limestone rocks, fr. 1. IX. 1962, G. R. PROCTOR 22709 (IJ); *ibid.*, rain forest, fl. & fr. 27. VII. 1963, W. R. ANDERSON, M. R. CROSBY & H. A. HESPENHEIDE 938 (BM holotype, DUKE, UCWI).

Note: This new species has no obvious close affinity.

Pilea proctorii Adams, spec. nov.

Herba perennis; rami caespitosi pendentes basi et disperse alibi radicanes, 8 - 15 cm longi, caulibus rubiginoso-pubescentibus pilis pluricellularibus. Folia disparia, distalia maxima, majorum lamina pinnatinervia obovata vel elliptica basi inaequaliter rotundata apice obtusa margine in dimidio distali serrato-crenata sparsim ciliata, (5-) 8 - 22 x (4 -) 6 - 10 mm, minorum suborbicularia 2 - 4 mm lata, supra glabra vel pilis paucis magnis pellucidis cystolithis dispersis cr. 0.2 mm longis, subtus in nervo medio rubiginoso-pubescentia cystolithis multo brevioribus indistinctisque; petioli usque 1 mm longi; stipulae semilunatae persistentes

0.8 - 0.9 mm longae, 1.2 - 1.3 mm latae. Flores et fructus ignoti.

Exsiccata: Jamaica, Westmoreland parish, One-day Cave, cr. 1 mile west of Rat Trap, cr. 1000 ft., moist shaded limestone cliffs, 23. X. 1960, G. R. PROCTOR 21499 (IJ holotype, UCWI).

Note: This new species has the affinity of *P. rufa* (Sw.) Wedd., particularly the new variety *microstipula* described in this article, but it is much less hairy. I have named it for Mr. George R. PROCTOR, original collector of this and several other of these new taxa in *Pilea* and for nearly twenty years as Botanist of the Institute of Jamaica, Kingston, an assiduous student of Caribbean flowering plants and ferns.

Pilea rufa (Sw.) Wedd. var. *microstipula* Adams, var. nov.

E typo speciei stipulis multo brevioribus 1 mm longis distinguenda.

Exsiccatae: Jamaica, Hanover parish; Pontefract, cr. 5 miles south-east of Askenish, 1000 ft., on moist shaded limestone ledge, fl. & fr. 30. X. 1952, G. R. PROCTOR 7295 (IJ); north slopes of Bubby Hill, cr. 1 mile south-west of Hillsbrook, 1000-1400 ft., on shaded limestone ledges, fl. & fr. 29. VIII. 1965, G. R. PROCTOR 26669 (IJ holotype, UCWI).

Note: This new variety with ascending shoots 5 - 10 cm high is a less robust plant than typical *P. rufa*. It has some affinity with *P. proctorii* and like that species has pale hairs.

Pilea suta Adams, spec. nov. (Pl. C)

Herba perennis 10 - 25 cm alta, superne ramosa, paulo lignosa, internodiis supernis 3 - 6 mm longis, ubique glabra. Folia crassiuscula; lamina integra trinervia 3 - 10 (- 12) x 2.5 - 7 mm, cordiformis, apice acute vel acuminata, lateribus late rotundatis, basi rotundata vel subcordata, supra convexa nervo medio et venis impressis, cystolithis intramarginalibus et in nervo medio magnis albisque, disperse paucis glandibus cum cystolithis aggregatis; petioli 1 - 3 mm longi; stipulae parvulae persistentes. Cymae unisexuales, ut videtur dioeciae; pedunculi plerumque quam petioli breviores, solitarii vel pauci in axillis vel in nodis aphyllis aggregati; pedicelli distincti; perianthium floris masculi 0.8 mm longum minute appendiculatum, floris feminei 0.4 mm longum. Achenium late ellipticum compressum 0.8 mm longum

margine tenui.

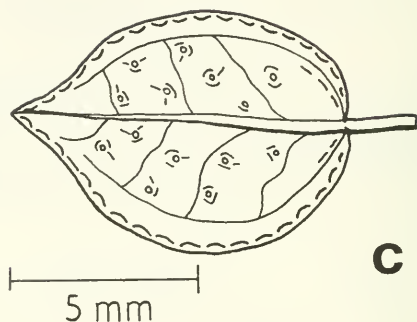


Plate C.: Abaxial view of leaf-blade of *P. sutia*, from PROCTOR 8013.

Exsiccata: Jamaica, Manchester parish, 1 mile south-east of Pike, 3000 ft., among limestone boulders, fl. & fr. 25. V. 1953, G. R. PROCTOR 8013 (IJ holotype, UCWI).

Note: This new species has no clear affinity in Jamaica. It comes near to *P. heteroneura* Griseb. of Hispaniola. It is named in allusion to the stitched appearance which the large white cystoliths give to the undersurface margins of the leaves when dried.

Pilea yunckeri Adams, spec. nov. (Pl. D)

Herba rhizomatosa perennis, ramis foliatis caespitosis ascendentibus 4 - 15 cm longis, ubique glabra; caules in sicco minus quam 1 mm crassi, internodiis infra usque 2 cm longis supra parvis quam 2 mm longis. Folia subaequalia in quoque pari, si dissimilia minora plerumque petiolis brevioribus, uninervia, petiolis adjectis 4 - 11 mm longa usque 4 mm lata, obcuneata, ad basim longe contracta, apice 5 (- 6)-lobata, supra fuscata cystolithis conspicuis inaequalibus versus centrum folii minoribus, subtus costa prominenti cystolithis quam supra multo minoribus vel indistinctis; stipulae late rotundato-semilunatae cr. 0.5 mm longae persistentes. Inflorescentiae subcapitatae, ? dioeciae, pedunculis femineis 3 - 7 mm longis, masculis 10 - 14 mm longis.

Achenium oblongum cr. 0.8 mm longum.

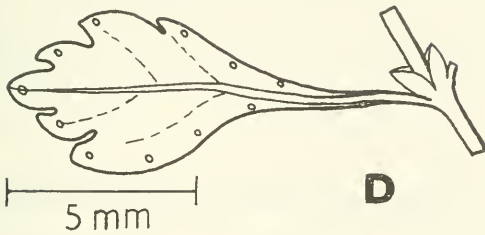


Plate D.: Abaxial view of a single leaf of *P. yunckeri* with cystoliths omitted, from YUNCKER 18831.

Exsiccata: Jamaica, Portland parish, Joe Hill above Moore Town, 1000-2000 ft., on moist rocks in forest, fl. & fr. 4. VI. 1958, T. G. YUNCKER 18831 (BM holotype, UCWI).

Note: This new species is named to commemorate its only collector so far, the late Professor Truman G. YUNCKER of Depauw University, Greencastle, Indiana, leading authority on Piperaceae and Cuscuta. Professor YUNCKER collected this plant while making general collections and studying *Piper* and *Peperomia* in Jamaica in 1958, in preparation for his "Piperaceae of Jamaica" (Bull. Inst. Jam., Sci. ser. 11: 1-56) published in 1960.

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